The 8 F-qbit Golden Register: A Non-Enabling Technical Disclosure

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Abstract

We introduce the **8 F-qbit Golden Register**, a constrained quantum register architecture based on **Fibonacci weighting** and the **Golden Ratio (φ ≈ 1.618)**. Unlike conventional qubit registers, this system enforces a **Zeckendorf constraint** forbidding adjacent excitations, yielding exactly **55 unique quantum states**. The architecture provides intrinsic **error detection**, **stability**, and **hardware compatibility** with blockade-based quantum platforms. The purpose of this disclosure is to establish **scientific priority** without providing enabling engineering details.

1. Motivation

- Current quantum internet proposals suffer from fragility (decoherence, error propagation).
- Classical error-correction introduces massive overhead.
- We propose an **intrinsically stable register**, inspired by Fibonacci mathematics and Sunnatullah's design patterns in nature.

2. Theoretical Foundation

2.1 Fibonacci Encoding

- Weights: {1, 2, 3, 5, 8, 13, 21, 34}.
- Register = 8 constrained qubits (F-qbits).
- **Constraint:** No two adjacent qubits can both be in the excited state.
- Result: Exactly 55 legal states (F_{10}).

2.2 Zeckendorf Representation

- Any integer in [0, 54] maps uniquely to a non-adjacent binary pattern.
- Example (schematic, not hardware):

    - `10100000` → 4
    - `01010000` → 7
- Illegal: `11000000` → forbidden by adjacency rule.

3. Architectural Features

1. **Intrinsic Error Detection**
    - Adjacent excitations → illegal → automatic error flag.
2. **Natural Sparsity**
    - Wide spacing of `1`s reduces local noise coupling.
3. **Hardware Affinity**
    - Constraint mirrors **Rydberg blockade** and **Pauli exclusion-like effects**.
    - Suggests physical realizability, but exact implementation withheld.

4. Golden Gates (Non-Enabling Description)

- **Golden Hadamard (Hφ):** Superpositions weighted by φ, not uniform.
- **Golden Phase Gate (Pφ(α)):** Phase rotation tuned to φ.

(Note: Exact gate matrices, decomposition, and control circuits are intentionally withheld in this disclosure.)

5. Arithmetic with Constraint

- **Guarded Incrementer:** Ensures addition of +1 maps state → next valid Zeckendorf representation.
- Example: 4 → 5 transition is valid.
- Algorithmically defined, but hardware circuitry is **not disclosed** here.

6. Applications (High-Level)

- **Quantum Internet Nodes** → Fibonacci-stable registers for entanglement routing.
- **Error-Resistant Memories** → natural detection of illegal states.
- **Secure QKD Systems** → unique code-space resistant to cloning.

7. Withheld Engineering Details

For patent protection, the following are **deliberately not included**:

- Physical qubit substrate choice (Rydberg atoms, superconducting circuits, photonic modes).
- Pulse sequences, voltage levels, or laser detuning values.
- Syndrome measurement circuits.
- Classical control logic for constraint enforcement.

These details will be disclosed **only after patent filing**, ensuring both **priority** and **protection**.

Conclusion

The **8 F-qbit Golden Register** establishes a new path for quantum internet architecture: a **mathematically rigorous, naturally stable, and spiritually harmonious system**. This disclosure records the **fact and priority** of invention, while deferring enabling implementation to future protected releases.